Interview with

Franklin F. Snyder

Early Years

Q: I want to begin by asking you to tell me a little bit about your family and your childhood.

A: Well, it's been a long time ago. I was born in Hogate, Ohio, which is a small town in northwestern Ohio. It's claim to fame, I guess, is because the famous comedian, Jerry Lewis, the man with the big mouth, you probably don't even know who he was, was born in Hogate. I went to school there through the grades. My father was the mayor of the town for most of the time, and he died when I was in the 8th grade. I had an older brother, five years older than I, who finished high school the following year.

As a result of my father's death, my mother decided to take me to Toledo to give me a chance at a better high school. So my mother and I moved to Toledo after 8th grade and before I began high school. I went to Libbey High School in Toledo. She put me through school by doing housework and other types of work. Part of the time when she was engaged, I would be able to live there, and other times I lived by myself.

The early years in Hogate were pleasant to remember. I mean we had normal circumstances and my father had a grain and flour mill. Before that, he'd been in the lumber business.

Q: Were you, did you have an interest in engineering or science before high school?

A: I was a prolific reader even in those early years. I would scrounge the neighborhood for books to read, and I was always struck by the adventurist life of the civil engineer. So, even while I was still a child, I had decided I was going to be a civil engineer. So there was never any doubt in my mind as to what I wanted to do. I don't know whether you are interested in anything more about the early years or . . .

Q: Oh, very much so, yes.

A: I don't have a lot of memories. We just lived a few blocks from the school that I went to. It was just a normal childhood. I trapped muskrats several winters and things like that. We had a pond where we could swim and ice skate. I remember one time we had a snowstorm that was drifting so much that you had to duck your head to get under the telephone wires. It was pretty deep. I always remember that.

One time I collected horseradish for the roots; I think we were in the kitchen. My mother was helping process it when the house caught on fire and burned down. We moved next door until the house was rebuilt. We were Protestants, but there was a Catholic Church next door. It burnt down one time, and they brought all of their sacred things over and stored them in our house for awhile. Those-are-just sort of things that I remember.
My mother's name was Farison, and my father's, Snyder, and there was a section of Henry County, which was the county that Hogate was in, and there was an area where practically every other farm was either a Farison or Snyder. They must have gone courting together because three Farison's married three Snyders, so I have a lot of double cousins.

Q: Now, had both of your parents' families been there for a long time?

A: Both families came to Ohio around 1850 when the canal lands became available. There was a canal built from Toledo, it was along the Maumee River and then it went through Indiana to the Wabash River, which then connected with the Ohio River. During that process, the states got lands on each side of the canal, just like they did when they built the railroads out West. Then Ohio sold these lands. That section of Ohio, northwest Ohio, was heavily forested, but, of course, they gradually cleared it off. The soil was and still is a very good, but it took a lot of drainage so they built a lot of tile drains and ditches.

Q: What were the courses in high school like?

A: I took the academic course, preparation for college. I was the valedictorian of my class and graduated in, I guess it must have been 19 18.

Q: **'28."**

A: '28, yes. That reminds me. I do remember World War I, they had a false armistice three days before the real armistice on November 11, 1918. That was one thing I always remember. My birthday is on November 11.

Q: Significant day.

A: Armistice Day, yes, yes.

Q: Were there any teachers in Libbey High School that particularly influenced your later career?

A: They didn't influence me as far as career-wise, but they did influence me in studying, and that sort of thing. It's hard for me to understand now why they have such a hard time educating children. I just can't understand what the problem is anymore. Everybody in those days, what they went to school for was to get an education. There weren't any side issues that kept them from doing that.

Q: So they made you work and do a lot of homework?

A: I don't really remember about whether I had much homework or not in Grade School, but I'm sure I did, although I don't think it was, it wasn't like it was in high school, that's for sure.

University of Toledo

Q: Now, you went from there to the University of Toledo?

A: **Yes.**

Q: Did you have any other options available to you? I mean was there a reason you went to Toledo?

A: We went there for the high school part. Then I intended to go to Ohio State, but financially , it was just better for me **to take the** first two years at the University of

Toledo and then transfer. It was pre-engineering courses that I took, and they were all accepted at Ohio State. So the transition was perfectly normal. There was no difficulty in transferring.

Q: So they mainly were the basic engineering courses, and you specialized only when you went to Ohio State then?

A: Well, yes, but I took the pre-engineering at the University of Toledo, in other words, the mathematics, and the physics, and that sort of courses that you needed.

Q: You intended to study civil engineering from the very beginning?

A: Right.

Q: So when you went to Ohio State, you had done all of your prerequisites so you could go directly into civil engineering courses?

A: Right.

Ohio State University

Q: Now, what was your field of concentration in civil engineering?

A: I specialized in structural engineering, but I never worked a day at it. We had a Clyde T. Morris as the civil engineering professor in structures. At that time, he was well-known. He was consultant on the--every once in a while he'd go to New York. He was the consultant on what's the famous big building?

Q: The Empire State Building?

A: Yes, if it was being built at that time, that was the building. It was one of the well-known buildings that he was the consultant on.

The civil engineering students took their hydraulics in the Mechanical Engineering Department. So I had some hydraulics courses there. When it came time to pick

a thesis, why, one of the instructors in hydraulics, a professor by the name of Ralph Powell, suggested that I do a thesis on rainfall and runoff. I had a partner, William Collins. The two of us did it together. He worked for the Muskingum Conservancy District, which the Corps of Engineers was involved in, and he eventually worked in our office here in Washington. He died at a relatively early age while he was still employed in our Civil Works' office.

We did this thesis on rainfall and runoff. We worked out all of the correlations using Least Squares, which at that time wasn't new or anything, but our professor in concrete was an expert on that sort of thing. So we ground out hours' and hours of Least Square solutions correlating the rainfall and runoff data. In that day, we worked with monthly data rather than daily, or shorter term data. That got me, that's what partly led to my getting away from structural engineering because I graduated in 1932 near the bottom of the Depression.

In 1930, when I had only been at Ohio State for a short time, I went to the Ohio State-Michigan football game. When I came back to my room, I started having a severe pain in my stomach. I had just been pledged to a fraternity so I went to the fraternity to eat. By the time I got there, the pain was terrible. The brother of one of the current members of the fraternity was a surgeon, but they couldn't get him right away. They got another doctor. By that time my stomach was just like a brick.

The doctor came in and said that if I wasn't so young, that he would say it was a ruptured ulcer in the stomach. But since I was so young, it must be appendix. But it was a ruptured ulcer. They took me to the hospital and the surgeon that they had been trying to get was available. My mother was still in Toledo doing her usual work, and they couldn't get hold of her. They brought me to long enough to get permission to operate. By that time I told them I didn't care. They could operate or hit me in the head with an ax, it didn't matter.

I was very fortunate because at that time, there was no medicine for peritonitis, and that's what you get when you have a rupture in your abdomen. It kills you rather quickly. Doctor McCready said he had all of my insides laid out on the. table, washing them off.

I was very fortunate, but I missed a quarter of school as a result of that. But there was a black woman, who was the cook at the fraternity house, who took care of me. So I stayed at the fraternity house during my recovery. With a ruptured ulcer, you have to eat soft foods, so she saw that I got the right things to eat and everything.

But as a result of missing that quarter of school, I made up almost everything except two courses. I didn't graduate in June. I had to go another quarter--they're on the quarter system there--and I graduated in December. There, again, I had the highest grades in my class, but since I didn't graduate at the regular time I guess the professors got together and decided that I couldn't have the prize, so they gave the prize to Collins for having the highest grade record.

That was in December of '32. It was sort of at the depth of the Depression. I think by about that time, the fraternity had gotten into poor straights and I was not living at the fraternity anymore. I was living in a rooming house.

The head of the Civil Engineering Department was C.E. Sherman. He was also the state representative with the U.S. Geological Survey. I don't know whether you know how the U.S. Geological Survey operates, but they have cooperations with all of the states, and he represented the state in the state's relationship with the Geological Survey. He also was the head of the States mapping: He was just finishing up a map of the State of Ohio. There'd always been an argument about the boundary between Ohio and Michigan, the part of it in Lake Erie. He was in the process of getting that settled. He gave me enough work so I could pay my board and room. So I worked for him for awhile on mapping and other things.

I was there when they had the Bank Holiday. I was in his office and he went over to his bookshelf, took a book out, he opened the book up, took a $20 bill out and gave it to me. He said he didn't know whether I needed it or not, but I could have the $20 in case I needed something while the banks were closed.

Q: Those were very difficult times, weren't they then?

A: Beg pardon?

Camp Hocking

Q: Those were very difficult times when you graduated?

A: Yes, it was. So I don't remember just when, but that was the time when they started opening up the CCC [Civilian Conservation Corps] Camps. One of the professors or instructors, Professor Wyatt, in the Civil Engineering Department had resigned, and he took the job as Superintendent in charge of Camp Hocking, which was set up by the Ohio Forestry Department to map the boundaries of some of the state

forest lands. So he hired three of the civils, two other fellows and myself, out of civil engineering graduates to do the survey.

I got the job of being in charge of it and having the office work. The other two, Henry Demboski '32 and Erwin Eckhardt '33, did the field work. They would take the CCC enrollees and train them in the fundamentals of surveying, and then start marking the boundaries of the state forest land. It was a lot of fun. I figured out where some cornerstones used to be, should be, and then I'd go hunting for them, and found a number of them, like that. But it was interesting. We were hired by the State Forestry Department. Since it was paid by the federal government, I got credit for that time.

Q: Time in service?

A: Time in Federal service, yes.

Geological Survey

Q: Now, according to your biography here, you worked at that for about a year, from July of '33 to April of '34.

A: Yes. Then because of my work on that water thesis and Professor Sherman's relationship with the Geological Survey, I got an offer to be a junior engineer with the Geological Survey on a special study that they set up to study floods, rainfall, and runoff. That was under the direction of a W.G. Hoyt. It was funded by PWA (Public Works Administration).

Q: There was also a Civil Works Administration for just a little while.

A: Well, anyhow, they had to have a political endorsement. Even then I was a Republican, but the camp carpenter foreman introduced me to the county Democratic Chairman and I went and talked to him. He didn't mind whether I was a Democrat or not. He gave me the endorsement, which was just a sort of a paper thing that they had to have in Washington. So then I was accepted as a junior engineer for the Geological Survey. It was a temporary appointment and not regular civil service, although again, I got credit for that time.

Well, it was a special project funded by PWA. The studies were authorized and directed by the Mississippi Valley Committee of the Emergency Administration of Public Works, subsequently the Water Planning Committee of the National Resources Board and assigned to the USGS. The best-known hydrologists in the country were consultants for the studies, so it gave me a chance to meet all of those people during that time.

Q: Who were they? Do you remember them?

A: One was Robert E. Horton, who still is widely quoted. There was W.W. Horner from St. Louis. Adolph Meyer of Minneapolis and L.K. Sherman, the father of the unit hydrograph, from Chicago. Merrill Bernard from Louisiana, who was a live-wire and who later on became my boss in the Weather Bureau, was a part-time employee. I don't know if we really want to skip to that now or not.

Q: We'll try to go along chronologically, I think.

A: That was really the beginning of my real interest in hydrology and in doing research. I always liked to do research work, so I worked on that in Washington. One of the staff, who was a clerk on the project, was Duane Paul. He and I roomed together. We had an apartment on G Street just about a block from the Treasury Building. We lived there for some time. Did our own cooking and everything. The USGS was in the old Interior building then and about two blocks from our apartment:

That project came to an end after, I guess probably a year and a half. Then I started writing letters looking for other work. Up to that time and even later, I had firmly decided I was not going to work for the Government all my life.

One of the men I met while on this project was chief engineer for the Pennsylvania Water and Power Company. His name was C.F. Merriam. He gave me letters to some of the chief engineers of some of the big hydropower companies, but none of them had a vacancy for me at the moment. W.G. Hoyt, the man in charge of this project, through his acquaintanceship with a man at the TVA [Tennessee Valley Authority], got me a job as a hydraulic engineer with TVA, which was a nice engagement. I had a chance to spend most of my time there on research.

We developed some flood routing procedures, which is one of the papers that was published in ASCE [American Society of Civil Engineers] with two other writers from TVA. I, being by myself, spent a lot of my weekends and a lot of hours doing

other research on streams in that area. I collected a lot of data and made a lot of studies. I used that data later on in some other papers, but I never did publish a paper just on that work in Knoxville.

Q: Now this was still relatively early in the development of hydrology in the United States.

A: ***Yes.***

Q: I mean, it hadn't progressed to the state it is today, certainly, and there was still a lot of work going on.

A: One of the interesting things, while I was back in Washington on the rainfall studies, there was a standard Geological Survey publication on groundwater. Meinzer was the author's name. At that time, he was the authority on groundwater. The groundwater they considered at that time was a base flow that went on forever.

It didn't make any sense to me that, in studying the hydrographs that we were analyzing there, that after a rainstorm, why, no matter how slow you figured the water moved true surface runoff would all have to be out of the basin within a fairly short time, and yet the hydrographs were way above what Meinzer called "ground water." So it just became obvious that there was "sub-surface storm flow," which was water that actually entered the ground, but came out of the ground rather quickly and was not part of the real base flow.

There were others who were developing the same ideas at the same time, but, anyhow, within my circle, I was the originator of the idea of this second type of direct runoff along with the true surface run-off. I looked through' the project report, ***Water Supply Paper 772, the*** other day and that idea was not even mentioned in our report. But, within a year or two, I published papers in which I expounded that theory.

Things were going on okay with the TVA, but there didn't seem to be any great room for advancement, although one of the men-we had bowling teams and softball teams. One of the men that was in the same bullpen I was in, who worked for the power section, later on became chairman of the TVA. I tried to think of what his name was, but I don't remember. That was some years ago, but that was quite an advancement for him.

But about that time, the Weather Bureau, the Geological Survey, and the State of Pennsylvania worked up a cooperative program where they were going to install rain gauges and study flood forecasting. Pennsylvania had just suffered the 1936 floods which devastated the state. This was an unusual federal-state program, where the state furnished the money. Generally, the Federal government furnishes the money. But in this case, the state furnished the money.

By that time, Merrill Bernard that I mentioned as a part- time employee on the Geological Survey Study had become Chief of the River Service in the Weather Bureau Washington office. He was the Weather Bureau officer that was working on this cooperative program along with a man from the Geological Survey and the State of Pennsylvania. They formalized the agreement and then started hiring people. So Merrill Bernard, the man in the Weather Bureau, contacted me.

Weather Bureau

The program was divided into two parts: one in the research, which I was to be in charge of; and another on the field work of putting out the recording rain gauges and everything, was under the charge of another man by the name of George Weber. So I accepted. I had a telegram, official Weather Bureau telegram from Bernard, after I had accepted telling me to report.

I mention that because this George Weber had been a regular Civil Service employee. So when he shifted over to state employment, the Geological Survey still paid his retirement pay which kept him in the federal service. At that time I still wasn't fully convinced I was going to be a government employee, so I didn't give much thought to it. But I should have arranged a similar deal with the Weather Bureau. So later on when I retired, which we'll get to eventually, from the Corps, I was scrounging together to get all of the service time I could. I tried to get credit for these two or three years in Pennsylvania. I had a Congressman write, and I had this telegram from the Weather Bureau and everything, but they never would accept that.

Marriage, October 1, 1938

I went to Pennsylvania then and that's where I met my wife. We were married in, I went there in '37, and we were married in '38, October 1, 1938.

Q: You went to Harrisburg, according to your vita.

A: Yes.

Q: Okay. So you went to the State Capital. That's where they set up the office to do that work?

A: Yes. We had the state divided into three sections: the Delaware section, the Susquehanna, and the Ohio. So I immediately started collecting data with the staff, getting information together and developing flood forecasting procedures for all three river basins. They were published by the, well, I don't know whether you'd call it published or not, but the state printed them. They weren't in a real book form. They were in a soft book. We had developed flood procedures for the three major basins.

Pennsylvania has always been a pretty strong political state. Whichever party was in charge, almost without fail, the employees paid their contributions or they didn't work. Well, I was assured that I would not be subject to that. We were sort of winding up the forecasting studies and most of the rain gauges had been installed. My wife was a secretary in the office of the head of the Forestry Service. But somehow, they got the word through her to me that they were going to start, that the Democrats were going to start working on me. I think it was suggested that I resign rather than get fired.

The Weather Bureau hired me then to go to Pittsburgh and be in charge of hydrologic services in the Pittsburgh Office of the Weather Bureau as a focal point for floodcasting the Upper Ohio River. They had also suffered severely in that 1936 flood, and so my wife and I moved to Pittsburgh.

Q: Okay. So you were in Harrisburg for about two years?

A: Yes.

Q: Let me ask you about this flood forecasting. Now, that had to be in its very early years of flood forecasting. What did you use as a basis for developing your procedures?

A: What we called gauge relations. In other words, from floods of record you would plot the reading at one point against the readings at the next point and on down the river system. Where tributaries come in, you could plot a family of curves. In other words, you'd have a family of curves instead of a single curve. You'd have a relation between three gauges then. That was the normal procedure, but while I was in Harrisburg I had started developing the relations between rainfall and runoff which had not been done very much up to that time.

As part of the project field work, they began to add to the reporting system where they'd have readers at these various gauges and they would report the reading into, for the Susquehanna Basin, to Harrisburg, for instance. The Weather Bureau, now the National Weather Service did then and now still does the river forecasting for the whole country. That's why they were around in this joint study.

So in the days before this, most of the Weather Bureau officials would, it would be a judgment call. They wouldn't have any fixed procedure, just based on their experience, and lot of them were real experienced, but just from their past knowledge. By having an idea how much rainfall there was, they would estimate what these river readings were going to be. So I developed a number of procedures, the relationships for a number of the river basins, as part of this study, whereas if you had so much runoff with certain, I think maybe that time I was using the base flow, the groundwater flow, as an index of how much runoff you'd get from a given amount of rainfall. Based on past studies of past storms, again, I plotted relationships between the index conditions, the amount of rainfall, and how much runoff vou would get. Then we used unit hydrographs to convert that rainfall into runoff. I don't know whether you want to, I guess it doesn't matter whether I jump around, does it?

Q: No, whatever you want to do to explain is fine.

A: In 1932, L. K. Sherman, who became a consultant on the Geological Survey study, developed what he called a "unit graph," which theory was that if one inch of runoff gave you a certain hydrograph, two inches of runoff would give you twice that hydrograph, but that the time scale would stay pretty much the same, but the ordinates, the intensity of the runoff, would fluctuate with the amount of runoff. You'd develop these "unit graphs" for one inch of runoff so then you could just multiply the ordinates by however much runoff you expected. But, of course, involved in it is the duration of the storm.

But he developed this idea, and it was published, in the *Engineering News Record.* Of course, it caught on rather rapidly, and I was using it then in converting these predictions of the runoff from a given amount of rainfall, converting it into a hydrograph of stream flow and using it in these flood forecasting procedures. I don't suppose you're interested in them. **I've** got a copy of them if you...

Q: Yes, I think we would be, yes, because this apparently was some very early work in this area that you were doing, L.K. Sherman in Chicago was doing, that you then took, and modified, or tweaked a little bit.

A: Beg pardon?

Q: That you took his work and you modified it, perfected it?

A: Well, I published a paper about this time based a lot on the work I had done on the side in Knoxville on those streams there. I published a paper on synthetic unit graphs, where you would develop a unit graph for a stream where you didn't have any records to study. That's where the name "synthetic" came in, and that's what got me the job with the Corps of Engineers, eventually. But, well, I diverted to get the unit hydrograph into the story here. (Note: Sherman called them unit graphs but we eventually called them unit hydrographs.)

Q: No, that's very important because one of the guys in the office asked me this, specifically to discuss the unit hydrograph with you, so you got me before I got you.

A: That paper got me world-wide acclaim. Years later on, when I did a lot of traveling for the Corps on a lot of international projects, it didn't matter where I went. It was translated into Russian and other languages. People knew who F. F. Snyder was. They were always surprised. They expected me to be an old man with whiskers.

Q: I was just looking at your vita here trying to get that paper that you mentioned. Okay. That's the...

A: With the American Geophysical Union.

Q: '*38,* '*39, '40, Transactions of the American Geophysical Union,* Section of Hydrology, on synthetic unit graphs. So that's what made your name?

A: Yes.

Q: That was all based on your own little work down in Knoxville?

A: Mostly that, but then, of course, I was in Harrisburg when I prepared the paper. I had all my information from Knoxville, but that would have been just a regional thing, so I incorporated and collected data on other areas. I had the Pennsylvania data also.

I collected other data so that it was, well, so that I felt that it would work most anywhere. I put certain factors into it that you could change when you got into an area where the characteristics of stream flow were considerably different than they were in these rugged areas that I had data for. Most of the areas I had at Knoxville were rugged territories--and even in Pennsylvania, most of them were certainly rugged. The procedure did work with the adjustment.

In other words, the Corps' offices started using it and you would study your stations where you had the records and you would develop these factors that you could then use to develop a unit hydrograph for an ungauged area, using the factors that they had developed in their own area. My wife and I moved to Pittsburgh then, and I became a civil servant then.

Civil Servant, Weather Bureau, Pittsburgh

Q: With the Weather Bureau?

A: With the Weather Bureau, although I think that took a little doing, too. But Merrill Bernard arranged it. He had the energy, always on the go. He'd been a private engineer in Louisiana developing cotton and rice lands. But he got mixed up with the Federal government during his PWA days, and he ended up being Chief of the River and Flood Service of the Weather Bureau.

That was the same time that Reichelderfer came in as Chief of the Weather Bureau. He was an ex-Navy officer. He organized the place like a ship. I think everything was vertical instead of horizontal. I think Bernard was there maybe a little before Reichelderfer, but when I came to Washington later on, Reichelderfer was there and

all of the forecasting was put in one division--the river forecasting, weather forecasting, and everything like that was put in one division. But that's aside.

In Pittsburgh, my responsibilities were entirely on the river work, and I suppose I developed some more procedures there, although we had already developed a lot of them. We had several significant floods while I was there for which I did the forecasting. I remember spending nights at the office and what not during these floods. I think the procedures worked out fairly well.

Q: How extensive were the rainfall and river gauging stations at that time?

A: The rainfall was perhaps a little deficient. But the river gauges, they were pretty adequate. Reports were available from navigation dams on the Allegheny and the Monongahela Rivers, which the Corps operated. There were gauges on all of the tributaries and that was the area that the field man had put recording rain gauges and lined up reporters to report the rainfall in to the central office. It wasn't too bad.

Q: Was the development of the rain gauge system more in the 1930's with modern communications, telephone and things like that, where you would have people being able to call in the readings?

A: Even before this, for years the Weather Bureau basic data for forecasting was almost entirely river and rainfall gauges which they operated. The Weather Bureau used to publish the river gauge readings for those stations, separate from the Geological Survey. The observers would phone or telegraph readings in to the forecasting office, wherever it happened to be for that particular river basin. We began to get into using radio reports, too, although not very much. That came a little later. The Corps was active in the initiation of radio reporting.

Q: But the development of these rainfall gauges was critical to getting the information early, wasn't it?

A: That's another story where Mr. Hathaway is the hero. I don't know whether you want to jump to that now.

Q: Well, we can do that, sure.

A: Well, why don't we wait a little while.

Q: Okay. Let me make a note on that.

A: When I get into Washington.

Weather Bureau, Washington, DC

Q: I don't want to take you ahead of the story.

A: That was a good engagement in Pittsburgh. I enjoyed it, particularly when we had a flood on. That always added a little spice to life. But eventually, there was a vacancy, or else he made a vacancy, Mr. Bernard moved me into Washington in his division, although, as I said at that time, they had reorganized so that actually, he was no longer the head of River Forecasting because it had been moved in with all other types of forecasting. But he had a special assignment as Supervising Hydrologist. He was still primarily in the river work. But actually, my boss was a man in charge of all forecasting. His name was Tannehill.

We moved to Washington then, and we stayed temporarily at an apartment near the Geological Survey. But then, through Duane Paul, that I had roomed with earlier, we got into Arlington Village. I don't know whether you're familiar with that or not, but it was a new development. The first development was Colonial Village, the one off Wilson Boulevard, right near Rosslyn. Well, anyhow, this same builder, Ring, built Arlington Village. They were row apartments, but they weaved in and out, and they all had a back court as well as a front yard, and they had very strict requirements. I think the rent was $48 a month.

Q: That's off Glebe Road, right? South Glebe Road?

A: No, off of Columbia Pike.

Q: Columbia Pike, okay.

A: They'd been converted into condominiums three or four years ago. It's right close in. It's right close to town.

Q: There are a lot of those developments and multiple housing units that. ..

A: Well, Buckingham is a little bit like it. Buckingham was built a little bit later. But Ring first built Colonial Village, right out of Rosslyn there, which was converted to condominiums. They made them preserve a piece of it. Of course, the original builder had sold it. The owner was required to maintain a piece of it as what do you call it when you preserve?

Q: Historic preservation?

A: Yes, yes. But anyhow, we were real fortunate to get in there. It was very nice living there. Of course, then part of my job in the Washington Office of the Weather Bureau was to do the river forecasting on the Potomac River, which was a function of that office. The man I think that had been doing it, I don't suppose he was too happy to have me arrive, but I think maybe one of the senior men had passed on or something, so the chap that was my assistant had never really been in charge. We had no trouble about that.

So I started developing the same type of river forecasting charts for the Potomac River. About that time, this Professor Powell from Ohio State contacted me to see if I was interested in getting a professional CE Degree from Ohio State. Of course, I was. So I used the development of the river and flood procedures for the Potomac River Basin as my thesis. One of the requirements for the professional degree was a thesis, an approved thesis. I went through the red tape of getting it approved.

But also, my job was to travel around to the various river districts that had a forecasting office located at one of the Weather Bureau offices. Generally, the forecaster was the official in charge. In other words, they didn't have a separate organization. The official in charge also did the river forecasting. My job was to try to get these people to put their knowledge on paper. As I said, most of them, they had it in their heads and a lot of them did a real good job, but when they left there was nothing left there for the next man.

So while doing that, I also for a lot of these river basins started developing the forecastingprocedures. I don't know how many. I suspect I developed the forecasting procedures for more river basins than anybody ever has. But that traveling around didn't make my wife happy. I guess I told you she passed away in January, did I?

Q: Oh, I didn't ask. Sorry to hear that.

A: But she managed all right, and I did do a fair amount of traveling. An interesting corhmentary, about that time they began to authorize travel by air. So when I was with the Weather Bureau, I had a mixture of train and air. But when I moved to the Corps of Engineers, you couldn't fly. You had to go by train.

Q: Is that right?

A: For awhile, not very long.

Q: That must have made your traveling very hard.

A: But about that time Gail Hathaway arrived on the scene. Well, he was already in Washington before I was. But I mean in my picture, he arrived on the scene. He convinced the powers-that-be in the Corps that the spillway capacity for the dams were not being adequately studied. I think the first one he sold was for Dennison Dam in Texas. He convinced them--and I don't remember the name of the general that backed him up--that they should have a meteorological study made as to what the potential rainfall might be for the emergency situations. With that as a start then, I don't know where he was before he came, well, I know in private practice he was out in Oregon, but whether he was in a field office of the Corps before he came to Washington or not, I don't remember.

Q: I thought he was in Omaha.

A: He might well have been.

Q: So many of those people came out of Omaha, right.

A: Started in Omaha, yes. He was in Washington. So he started the idea of having a Maximum Probable Flood (later changed to Probable Maximum Flood) for the design of dams. As part of that, he sold the Corps on putting into their appropriation money for a nationwide recording rain gauge program, which was sort of, well, I guess it sort of followed the effort that Pennsylvania had done by itself. But that idea took hold and so the Corps got the appropriations and transferred the

money to the Weather Bureau and they began to install recording rain gauges all over the country into a national network.

About the same time he initiated the other program of having the Weather Bureau set up a Hydro-meteorological Section, who would make these studies of the maximum probable precipitation for the Corps' projects. That, again, was funded by the Corps through direct appropriations showing what it was for. It was not buried in the regular appropriations. It was an appropriation that was to go to the Weather Bureau. His principal assistant was Al Cochran.

Q: Okay.

A: A little later, a number of the people began to take commissions in the Army and go into the service. That would have been--well, I transferred from the Weather Bureau in '42, Hathaway maneuvered that. It was primarily because of the unit hydrograph studies that Hathaway wanted me to come over and work in the Chief's Office. About that time, the Weather Bureau, they had some sort of a program where you could get an increase of $100 a year, and they wouldn't give me one.

Hathaway proposed that I come to the Corps, and I guess it was a promotion involved, too. I think I went from an assistant to associate, but anyhow, I transferred then to the Chief's office.

Headquarters, United States Army Corps of Engineers, September 1942

Q: Okay. That was in September of '42?

A: Well, September of '42, we had the second highest flood-of-record on the Potomac River. I had just transferred, but I went back to the Weather Bureau and did the forecasting. I did a pretty good job of it, too. I think I hit the Washington forecast within a few tenths of a foot. I was a little high upstream. But, you see, they had built a bunch of bridges, temporary bridges, across the Potomac. They kind of screwed things up a little bit, but we tried to estimate for that.

I remember before the crest had arrived, I'd been down at the Weather Bureau office, I guess, to around midnight or so, and when I was driving home, I stopped there at the Washington Monument on 17th Street and they were laying sandbags across the street there to keep the water from--the Reflecting Pool was going to be

flooded, but they were blocking off 17th Street so that water wouldn't get up, and around the Navy. The Navy had a lot of buildings along there.

Q: Temporary buildings in there, yes.

A: They were building sandbags along the back there. I stopped there on the way home. A man couldn't understand why there was water on both sides of his sandbags. They eventually found out someone had forgot to shut some valves on the Reflecting Pool, and the water was backing up through the Reflecting Pool and getting up on the wrong side of the sandbags there on 17th Street. I enjoyed that experience.

With the Corps, my principal work was with the operations of the reservoirs for flood control. I was in charge of that work. A lot of other routine stuff that flows through an office.

Q: Well, the Corps didn't t have. . .

A: It didn't have too many reservoirs yet then. Is that what you were going to say?

Q: No. I was going to say it didn't have too many hydrologists at that time.

A: Well, I don't know what they were, I suppose my rating was hydraulic.

Q: Yes, I imagine you probably were a hydraulic engineer.

A: I'm sure they were all hydraulic engineers then. I'm sure that's what it was--that's what it was with the TVA and the Weather Bureau.

But Mr. Hathaway was an outgoing man that made friends easily. Even I think in those early days, he had his eye on being president of the ASCE because he did a lot of traveling, and he met a lot of people, and made a lot of friends all over the country. Rightfully so because he was quite a man. He had, of course, the backing of the powers that be. He got things done that most people wouldn't have been able to get done like setting up those programs.

Q: Well, he had very good relations with the Chief of Engineers, Reybold, at that time. Eugene Reybold?

A: I'm not sure who was Chief when I transferred.

Q: That's who it was. He was the Chief throughout the war.

A: He was Chief for a long time, right.

Q: Yes.

A: He was Chief when I went overseas.

Q: He was from '41 - '45, for four years.

A: Yes.

Q: And Thomas Robbins was the deputy chief.

A: Yes. I got to know Robbins quite well later on. He was on the board of the St. Lawrence Seaway Project. He was involved in the design, I guess, some board that they had set up. I got involved in the St. Lawrence Seaway later on. Well, I hadn't been over there long before Cochran went into the service. Hathaway was chief of the branch or whatever it was. I guess it was a branch or a section.

Q: Was that Hydraulic Engineering Branch?

A: I'm not sure what they called it then. Later it was Hydrology and Hydraulics. I probably have an organization chart someplace. It was either a section or a branch, however they were organized in the Engineering Division, and Hathaway was the head of it. Cochran had been his chief assistant. Mark Gurnee was another friend that went into the service at the same time. I forget where he was at that time; I think he was in a different branch. When he came back, he worked in our branch for awhile until they found another opening for him.

Q: There wasn't much work going on in Civil Works in the Corps at that time, but there were flood problems.

A: Yes, I was trying to think what, I don't really remember what I spent most of my time on in the beginning because there weren't too many reservoirs to operate either. So it must have been just the routine review of hydraulic features of the reports that the field submitted. A lot of work was done on the manual for design of airfields. Of course, we, our branch, Hathaway's branch, was the liaison with the Weather Bureau on this rain gauge and Hydro-meteorological Section and probable maximum precipitation. We had to report, you know, make the reports to Congress for the funding for those programs. Ralph Wilson in our office handled the details on these programs.

Q: About that whole idea of doing the probable maximum flood and all of that kind of thing, that was relatively new for the Corps in its planning process, Civil Works process?

A: It was new to the whole world, and the whole world has copied it.

Q: Hathaway is the one that came up with that?

A: Hathaway was the father of that business, right. There was just no competition. Quite often when somebody develops something? somebody else claims to do it at the same time, but Hathaway was way out ahead of everybody on those things.

Q: He didn't seem to have any problem getting the structural people to go along with that then, or did he have problems?

A: No, I don't think so. Not that I know of. He had the backing of the head office. It wasn't an instantaneous thing, but the change in procedures was adopted when we started working on a number of new projects. There'd probably been a lot of projects approved, but the details had never been developed. There was a grand program approved on the Mississippi Basin study years before, but they weren't building them until this period of time. Our branch sent out the instructions and the requirements for what had to be done in the design of the spillways to take care of the large floods. Certainly, there must have been some people that thought it was crazy, but there was never any official problem with getting it accepted. It had to be accepted and the credit goes to Hathaway for all of that.

Q: There were a lot of procedures you had to install and policies that had to be implemented.

A: Right, yes. I don't know when the engineering manual started, whether we had them right away. Eventually, that's the way we sent out the guidance on how to do things. Eventually, all of this stuff was in the engineering manuals. There were engineering manuals on the spillway design and most other features of project design.

Q: A lot of that was entered into the whole planning and design process, so I guess it had not been in it before, the requirements for the hydrologic studies.

A: It was what?

Q: They had to put that all into the design process.

A: Yes.

Q: A lot of it had not been considered before.

A: I don't know how they did it before they used this rainfall data and computed flood design. Design was probably based on study of past floods. But that's where the unit hydrographs got used, the synthetic unit hydrographs, because the Weather Bureau gave them the rainfall, but the field offices had to convert this rainfall into stream flows, and most of the offices used unit hydrographs. They weren't necessarily synthetic ones. If you had a stream flow record, you could develop a unit hydrograph from the records of past storms. But then to transfer it from where your gauge was to where you wanted to use it, the synthetic procedure had these factors in it which allowed you to make a transfer. In other words, you would determine the factors at a place where you had records, and then apply it at the dam site or wherever you subdivided the basin.

Q: Well, one of the problems, too, was that there weren't a lot of really good records for all of the river basins in the country.

A: No, there weren't.

Q: You didn't have more than what, even by that time 75-80 years of good records, good statistical records?

A: No. The records that they had, the quality may have been all right, but they were short and there just weren't too many of them. Very few records were as long as 50 years. I didn't mention that, but at the same time that Hathaway started a similar program of putting out rain gauges, he also started a similar program with the Geological Survey where they put in a bunch of stream gauges that we wanted for our studies, and which the Corps paid for. The same sort of program as they did for the rain gauges. Of course, Hathaway is the one that started that, too.

Q: I believe the Corps is still paying for that, for the gauges for the Geological Survey and the Weather Bureau, both.

A: Yes, I think they still do. I saw something where Congress is talking about eliminating the Geological Survey completely. I just can't imagine how an idea like that would survive. You would think that all of the engineers in the country would raise hell about that. I haven't seen anything about it lately.

Q: They may have decided there were better things to do than that. But at that time, you didn't have any problems, but I found, talking to people like Verne Hagen that they ran into problems with the relationships with the Geological Survey, and between the Geological Survey, Corps, and the Weather Bureau, on defining various common terms of reference, like national probable flood.

A: Well, the Bureau of Reclamation was the one that probably had more initial reluctance. They finally became believers, too, and they sort of joined in with our support of the Weather Bureau. They finally started hiring the Weather Bureau to develop storms for them, too. But for a long time they took a dim view. I guess a lot of private engineers to this day think it's out of this world. But there have been enough extreme floods that have happened that it should have made believers out of most of them, because even now they're going back and rebuilding some of the original spillways that were built by the new procedures. They came up with bigger possibilities, I guess. I am not familiar with the more recent developments, particularly if there is a national probable flood. Sounds like someone trying to save face.

Q: Well, I think two years ago they came up with a bunch of bigger probabilities, didn't they, in the Mid-West there, that they had never thought of?

A: Yes.

Q: But mainly what you were doing was making models, weren't you? You were developing models of rainfall and floods that they could use? So if you were to do that today, it's all on computers, what you were doing.

A. I'm not sure that I can. . .

Q: What I'm saying is you basically developed the models?

A: Well, yes, we didn't call it that.

Q: You didn't call it that, but that's what it is.

A: That's the popular term now, I guess. But we have another story when we get to computers.

Q: All this was done by hand calculation and by what, adding machines, what do they call them, calculating machines?

A: Yes, I'm trying to think. We did not have the hand-held calculators. That I know. It was done with slide rules.

Q: Slide rules mainly?

A: Yes. That is the normal calculations. I'm sure everybody used slide rules, but whether they used machines to back it up or not, I don't know. I don't think so, because the slide rules accuracy, generally, was good enough for most computations.

Technical Representative, European Theater of Operations, 1944-1945

Q: You weren't going to multiple decimal points, I don't think on those calculations.

A: Damn that decimal point, huh? I don't know whether there's anything more before we get into the Rhine River business.

Q: No, we can do that if you want.

A: Incidentally, did you take that article by Dzuiban?

Q: I do have that. Do you want that?

A: No, you can make me a copy.

Q: I have it right here.

A: Yes. I don't know who started it or why, somebody over there realized that they had a problem with the Rhine River and so the Chief Engineer asked Washington for someone to come over and survey the situation. Hathaway got that assignment. Well, Al Cochran was over there in the Paris, in the Chief Engineers' office in Paris. When I was there, they were building hospitals. They knew he was a hydraulic engineer. I'm sure he got together some hydraulic data on the river and whatnot, and I'm sure he recommended that they get Hathaway.

Hathaway went over. He was a good choice for that because he knew a lot of the engineers of the various armies. He's the kind that could go around and make friends with them all. He wasn't over there too long when he sent back a request for a meteorologist, an engineer, and a hydrologist. I don't know whether he asked for me by name or not. He probably did on the meteorologist. The chief of this Hydro-meteorological Section that the Weather Bureau had set up under the Corps' sponsorship was a Don Cameron. He probably asked for him by name; but whether he asked for me by name or not, I have forgotten.

But when the word got around the office, I told them if I didn't go, I would quit. I meant it, too, because there wasn't anybody that had the background I had in developing flood forecasting procedures. Probably by that time I'd developed flood forecasting procedures for 20-25 different river basins for the Weather Bureau. There just wasn't anybody that would have been better for the job than me. And, of course, I was selected. Whether it was a selection or a request, I don't know.

Then I immediately started collecting data and things. I don't know how much lead time I had, but the request went to Vicksburg for hydrologic data. In some of these articles, or I don't know whether it's in here or not, but I saw an article in my file, it was just about all of the work that Vicksburg did for the Rhine River flood forecasting work. But they did have a lot of records, actual gauge records, and other things, for different stations on the Rhine.

Q: All of its tributaries, too, I imagine.

A: Yes, yes. That data all came and I started tabulating, and began plotting gauge relations right away. I'm a little hazy on how much of if I had done before I left, but I must have had gotten about all I could out of that data before I left. Cameron and I went together, went to New York, and then I forget the field there that military aircraft left from, and we flew into Paris.

When we left, we didn't know whether we were going to London or to Paris because they said depending on the military situation, we might have to go to London and not go to Paris. But we ended up by going direct to Paris. The last leg overland, they flew right close to ground and boy, was it rough. I remember that. That was really a rough ride after we got across the ocean going into Paris. But everything went fine. They had quarters for us. Cochran was taking care of that. His commanding officer was Colonel W .G. Lyles. He became a friend and later on, Al Cochran when he retired, went to work for him down in Columbia, South Carolina. He was a head of an engineering company in South Carolina.

We had quarters there. The one thing that's outstanding about Paris was the champagne. These fellows traveled around all over the country on these hospital projects and as long as they had the empty bottles, they could get all of the champagne they wanted. It was the bottles that were scarce. So they brought champagne back by the cases.

They had hired a French ex-patriot, who had moved to South America and married the daughter of a prominent owner of a large construction company in South America. He had come back for the war as an expert. In fact, they brought him back the same way, I guess, as they did us because he was knowledgeable about the bridges. He apparently had worked on a number of the French bridges before he went to South America. After they got him, they could not figure out what they got him for so they assigned him to us, to our hydrology project, because he was French, and he did help us some in collecting more information. Later on, he got assigned to the correct area.

Q: Back to Paris and your French colleague.

A: His name was Pierre. I forget what his last name was. But anyhow, that's just sort of a side issue. I thought maybe I ought to try to learn a little French and I figured he, being available, might make it easy. But when he started pronouncing those French words for me, I decided right away that it was a hopeless case, so I quit trying to learn French. My ear, I have trouble understanding English-speaking people that have a little accent, so how in the world was I ever going to understand French? My hearing back then was poor. Now my hearing is shot. But even back then, my hearing for music or anything was no good at all so I decided right away not to try to learn French. You could get along very well, particularly during the war, with English.

We stayed in Paris for several weeks. We did get a little information there from the French organizations, but really not very much. Everything was still basically what we got from Vicksburg. Then the forecasting unit was being organized. George Mittendorf, he was a major, and, again, a Corps civilian, who had taken a commission, was in charge of the flood forecasting unit. We were assigned to the Chantilly, which was a race course town, about 30 kilometers out of Paris. It was where the 21st Weather Squadron was located. I think it was the 9th, and I think they were at the 9th.

Q: 9th Air Force?

A: 9th Air Force rear headquarters. I'm not sure it was the 9th. It was one of the Air Force headquarters.

Q: It probably would have been. The 9th Air Force was a tactical air force.

A: They had taken over a Rothschild chateau. They were in the main building. There were some temporary buildings. I believe they were converted stables that we were assigned to. I guess, at least I tell about it, it was the policy that the U.S. Forces took any property that the Germans had taken when the U.S. took it over. They didn't take new property away from the French, but they kept what the Germans had taken if they needed it.

We were billeted in a real nice, I don't know whether they called it a chateau or not, but it was a real nice mansion that the Germans had been using. It was in the town about a mile or so from the office. The headquarters were out at the edge of town, and it was walking distance back and forth from the residence to where our offices were.

So we had, I think in my paper there I describe how many people we had, but it was Mittendorf who was in charge. I think he has died. Al Cochran and Bill Lyles are also dead. Mittendorf was the head civilian in the Atlanta Division office after the war. I don't know whether this has anything to do with the story, but when, a few years back, the commanding general died and I think Mittendorf later on married his wife there in Atlanta.

He was in charge of the unit. We had several G.I.s and, Don Cameron was there. He had the contact with the Weather Service. In other words, he got all of the weather information that they could collect for us. All this is told in the articles about how we operated. Hathaway had gone around. He had visited all of the engineers of the various armies and arranged for collecting gauge readings and for putting in some additional gauges or replacing ones that had been destroyed.

At that time we had one bank of the Rhine and, I think, once or twice some of the G.I.s were killed reading the gauges. But the reason we were at Chantilly was the communication system. In other words, the data that we could get would come in, and then the forecast would get back out to the armies in an efficient manner. I never went into that. I'm not sure just how it all operated, but it apparently operated pretty good because of the planning and communicatins facilities there.

The upper river gauges were in Switzerland on one side, and Germany on the other. The Swiss couldn't give us that information, but somebody, the intelligence people arranged with somebody to get us the Swiss gauge readings.

Q: So you did have the-Swiss readings?

A: Yes. Then quite a bit of the time, the Germans were broadcasting river data in the clear. They apparently felt it was of more value to them for navigation and maybe they didn't know we were interested in it. Every so often someone picked up for us the river readings broadcast by the Germans for some of the gauges on the tributaries in the German held area. They were very helpful.

So we finally got organized there and developed a system for the forecasting which is described in my ASCE paper, I mean the routine of how often and where we made a forecast were pretty much dictated by when we were able to get information. We ended up in making two forecasts a day at noon and midnight. So things started shaking down, and we put out our first forecast 27 January '45.

We went over in late November. In December and January was the Battle of the Bulge. They issued orders that everybody was to carry a side arm. Of'course, I didn't know whether that applied to me or not, but I love guns so one of the G.I.s picked up a Belgian pistol for me, so I got to carry a side arm. We had an awful lot of snow in January. It was stormy up at the Bulge, too, but we had a lot of snow in Paris, too, that January.

Q: When the Battle of the Bulge first started, how did the headquarters react to that? There apparently was a lot of panic and uncertainty.

A: We could go into Paris every Saturday--there must have been some other activities in these buildings with us, and so every Saturday there would be a couple of trucks going into Paris, the guys would go in and then come back Sunday night. But we really didn't have any, I didn't have any military contacts at all except just immediately in our own unit there. But, the notice about side arms, and everything came out in paper. I don't even know who issued it.

But I suppose there was concern. There couldn't help but be. Who knows what would have happened if the Germans had succeeded there. It would have been a mess for awhile, that's for sure. There have been several different programs about the Battle of the Bulge. That's where, I forget his name now, sent back the nuts to the Germans.

Q: Oh, Anthony McAuliffe?

A: Yes, to the Germans.

Q: Well, that's not what he said.

A: They couldn't figure out, according to the movie at least, they couldn't figure out what that meant.

Q: Well, that is subject to a lot of interpretation.

A: Yes.

Q: They're not certain for certain what he said. He may have said something else to them that couldn't be printed.

A: Yes, that's right. After going through that battle, he probably did say something else.

Q: Now, how long were you in Paris for this work?

A: Only a couple of weeks before we moved to Chantilly.

Q: Then you were there how long?

A: I came back in May, so I was there from December--the original assignment was three months. They had to get it extended then for another three months. In looking through my file, I found a paper where I had to get the permission of the Draft Board.

Q: Draft Board?

A: Draft Board, yes. I had a deferment because I was working for a military organization, but I had to get their permission to leave the country.

Q: You would have an exemption. Not an exemption, a deferment or something?

A: Yes.

Q: Yes, I know. It wasn't a 4-F. You were a 3A-something or a 2. There was a number that you had. You had a specific number that exempted you.

A: Yes. I have the paper downstairs where I got their permission. I didn't have to get too many shots because I'd already been doing a lot of traveling, so I was pretty well up on my shots and everything before we went overseas.

Q: So this continued up through the seizure of the Bridge at Remagen and the crossings in March?

A: Yes. One side light in Paris. It was the same thing with perfume as it was for champagne. There were a number of the well-known perfume stores there right near where the Army people were. They would only open up once a week, and all of the G.I.s would line up to and get it. If you had an empty bottle to turn in, why it was real easy to get perfume.

I went to a night club one night so I must have been in Paris for a couple of weeks at least before we moved to Chantilly . I also was there on V-E Day. I went into Paris on V-E Day. I've got some pictures. Don't know whether I could fnd them or not of all of the people and buildings on the Champs Elysses.

Q: That must have been quite a day, huh?

A: We had quite a time, although I just stayed there during the day. I went back to Chantilly late in the afternoon. By that time, I had trained one of the G.I. s, which has been described in the paper, to do the forecasting so I could go home. I went back so that he could take his turn at celebrating that night. Getting back to forecasting, in the article of the ASCE I have some sidelights on the place where we lived. I don't know whether you want to hear about those. ..

Q: Sure, sure.

A: The janitor was a jockey. He was doing janitor work because there weren't any races going on. He would come in the morning and would build up the furnace, heat everything up while we were all at work, then when we'd come home, he'd bank the fires and there wouldn't be any hot water or anything when the men came back. So I caught onto that and they changed his way of living. During the day the maids had all of the windows open and everything. He had the furnace roaring. When we needed the heat at night, he was gone and the furnace was banked.

Q: Kept him warm though, right?

A: I don't remember Cameron being there, but he must have been in the same building with me. The other people were all fairly high-ranking Air Force officers. They were a nice bunch of people there, and they had a deal. The military was not supposed to take anything out of the French economy, so they had a deal where they supplied the baker with American flour and. we got our French bread every day. Boy, that was good. I love French bread. Once in awhile, they'd be flying into London or somewhere. They'd bring some eggs back from London. But that was an experience there.

The heating system, no one could understand why we couldn't get any heat at night. It was a complicated system. The hot water storage was up in the attic and the heated water would go up there, I guess, and then get distributed and a lot of times people couldn't get a hot bath. Cochran sent a mechanical engineer out from Paris and on Christmas Eve, Cochran and I explored the heating system. We finally figured out something so that we could at least get some hot water for a bath. But that was a side light.

One event that happened, there are seven dams on the Upper Rhine where half of each one was controlled by the Swiss and half by Germany. There was always talk about the Germans blowing up some of those dams. One day, just before we issued our forecast, we got a message that the Germans had blown up one or two of the dams, so we quick figured out some new forecasts. Another message came in saying that the Germans had planned on doing it, but the Swiss had talked them out of it or something. They had not blown the dams up.

Q: Well, that was the real fear, wasn't it? It wasn't so much of the rain as the Germans would blow the dams on the upper Rhine and that would flood the downstream area.

A: Yes. Actually, it would not have extended far because they're relatively small dams. It would have been disastrous for some distance, but it would never have been carried too far. If they had synchronized and blown-up two or three of them, timed them all and everything, they could have sent a pretty good wave downstream. I don't remember how we estimated what would happen downstream. Anyhow, it didn't happen.

Q: Well, there was great concern that it would happen in the midst of the crossing operations that would either strand forces on the east bank or else seriously disrupt the crossing.

A: There was some concern, I think more concern might have been with some of the bigger reservoirs on some of the tributaries because these dams on the Swiss and German border were mostly power and navigation dams and they didn't have too much storage in them, whereas some of these tributary reservoirs were fairly large. You know there was a big story about the British blowing up one.

Q: Well, yes, there were the two big reservoirs on the west side of the Rhine there, the Urft and Schwamrnenauel. They did blow the outlet valves during the Roer River crossing in early February. It caused a lot of trouble until they emptied completely out.

A: It seems to me there was one on the French side that failed, too. I'm not sure about that. I don't remember what that was. Seems to me one of the American armies had some flooding problems.

Q: It was the First Army.

A: Beg pardon?

Q: The First Army's the Roer River offensive in February of '45, the Germans did indeed blow some of the dams, the outlet valves, blew them open and it caused a lot of flooding. But it wasn't as disastrous as. . .

A: It wasn't like the whole dam going out, yes.

Q: No.

A: I guess maybe that's what I was thinking of rather than the French.

Q: Two of them had it. It was up on the, up toward Holland, east of Holland, in that Rhineland area, to the west of the river, west of Cologne. We had problems up

there. Did you ever get up to the Rhine? Did you ever get out of Paris while you were there?

A: Well, the substitute that was being trained, his name was E.A. Withers. He had been in the Los Angeles District office. I don't know whether he was a sergeant or not, but anyhow, he got experienced enough so that we would take turns doing the forecasting. Then it got to the point where I felt that in April, it was time to go home.-So Mittendorf left about that time, too. But we prepared a paper and explained the situation that Withers was prepared to do the forecasting and that the unit could continue to operate. So we got approval to come home. Of course, the Army was getting all of the readings they wanted. As time went on, the responsibility for forecasting began to change hands. Some of the French and Germans began to do it.

Then after that happened, I got orders. I spent three or four days in London on official duty. Then I got to go up to Mainz. The general there was most accommodating. It's shameful I don't remember his name. He had a nice speedboat, and he took me for a ride on the Rhine. Then we went up the Main River up to the point where there was a dam. You couldn't go any farther. So then we got in a small boat, and we could go through the gates of the dam, got in a small boat and went up a little farther up the river. But he was really nice to me so I had a nice visit, as you say, on the Rhine after the serious forecasting was over.

Q: That wouldn't have been Patton's engineer?

A: Beg pardon?

Q: Johnny Conklin?

A: I'm not very good at remembering names.

Q: There's another one who was engineer for Bradley, Pat Timothy.

A: The name Timothy rings a bell, but it may be because of some other connection.

Q: That's all right. You may recall it and jot it down.

A: I don't think I'll ever be sure of his name because I've tried. All of the generals back those days, they're all gone now, too. But I've got copies of the letter from General Moore thanking the Chief of Engineers for our services.

I'd been pretty well tied down. We made forecasts seven days a week. After Ernie, that was Wither's first name, got so that he could spell me off, and, after the crossings were over, it wasn't quite so critical that I be there all of the time, but I did enjoy it.

My wife had a cousin that was stationed near London. He was in the Signal Corps. He was a pigeon fancier. He had trained pigeons and everything and as surprising as it may be, he got into the same work when he was in the Army. They always say you never get your work. But anyhow, he was located somewhere near London, and I don't know how I got in touch with him, but he came into London and we spent some time together in London.

Q: I know the Army still had a pigeon service.

A: Yes.

Q: Amazing they did have that. So you came back in May then or June?

A: May.

Q: May of '45?

A: '45, yes.

Q: Did you ever get to meet the Chief Engineer, General Moore?

A: I don't think so, not when I was in Paris. I'm not so sure that I might have met him later. Do you know what he did after, where he was assigned?

Q: He retired in '46 and then went to work for Baltimore. He was involved in building Friendship Airport [now Baltimore-Washington International Airport, BWI] .

A: I don't think I did. He was the one that signed the thank you letter though.

Q: Probably. I know I spent a lot of time with him before he passed away.

A: Is that right?

Q: He was very appreciative of your work, I can guarantee you

A: Is that right?

Q: He was very concerned about that problem and was involved with getting you people over to help him because he was really very afraid that the Germans were indeed going to do that. It would catch a lot of his assault forces right in the middle of the river.

A: Yes.

Q: One of the things he very much appreciated. Is there anything else about that time in Europe you want to mention? Were there any new techniques that you worked out, or any ideas you may have come up with while you were doing that?

A: No, Cameron, was limited in the amount of available weather data. The 21st Weather Squadron there prepared maps which he got everyday. He did his best in forecasting rainfall which, as I say, he did the best he could. I never let on, but I just couldn't rely on it too much because I just depended more on what gauge data we had. If there were indications of heavy rainfall in some area, I could take advantage of that in the forecast.

But the procedures were just the same that I used on the Potomac, the Susquehanna, and the Ohio and the other basins. There wasn't any opportunity to, in fact, they were probably a little cruder because of the lack of information. So there was nothing really, there wasn't any research I did while I was over there.

Q: Your data for the western tributaries, then, was fairly good. But it was just the eastern tributaries that were German property had very little data.

A: There were several, and the Main was one of the major ones, and I've forgotten the names, several of others that we estimated everyday to work into our mainstream forecasts. On two of those tributaries, we were getting these German readings, not everyday, but whoever was picking them up picked them up whenever they could. They were a big help. There just wasn't any chance for any research or anything.

Q: Okay. This is a good convenient point to stop for tonight because I've gotten to the end of your Rhine Flood Prediction Service work and the end of World War II in Europe. We can tape your going back to your career in Washington next time, if that's all right with you.

A: Okay.

Q: All right.

A: When I was with the Weather Bureau in charge of the River and Flood Service, at that time, the Weather Bureau put out a daily Washington Weather map. After I got there, probably after Pearl Harbor, they slapped security on, so I was one of about five people that got copies of that weather map. The President got one, and Congress got one, and I got one. There were only five of them distributed because of security. I don't know why, but that always amazed me. I don't know whether I saved one of them or not.

Q: Hard to believe, isn't it? That they would consider the weather map to be a security issue.

A: I don't know how long they did it. Also, my wife and I took weekly turns manning a station, reporting airplanes all night long. They did a lot of stuff like that.

Q: You were in the Air Warning Service or whatever they called them?

A: She was a nurses aide, too, while I was in France. She took a tour of duty up in the Newton D. Baker Hospital. Is that in West Virginia or Pennsylvania? Do you know?

Q: I think it's in West Virginia.

A: Yes. She spent some time up there. They had a lot of German prisoners there while she was there. Then we did that air raid warden bit.

Q: As if they were going to attack. A lot of that now we know was just for morale.

A: Morale, yes. But it was awfully chilly up there some nights in that they built a tower and it was cold up there.

Q: Do your part? Is there anything else?

A: No, I think that will be it.

Q: Okay.

Review of High School

Q: Today you wanted to give some more details on your time in high school and your career?

A: Right. One summer I worked for a department store in Toledo. The principal of the school got me the job. It was the Tiedkes Brothers Store. It was really an unusual store for those days. It was a place where you could buy anything from an automobile to practically anything. Toledo is a lake port, of course. That's where they load much of the coal from southern Ohio. They haul it up there by train and then put it on the lake freighters. The Tiedke Brothers started their business by taking supplies out to the ships, and they ended up with this big department store. But that's sort of unimportant.

Q: Do you remember how they spell the name?

A: It was, I think, T-i-e-d-k-e-s, I believe it was. I am not sure. I haven't been back to Toledo very often.

Q: That's just for the transcriptionist, so she have an idea of how it was spelled.